Tributary Tribune



Stories and art by members of the Watershed Stewards Program

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WSP Members and the Daily Acts organization celebrate after sheet-mulching a 10,000 ft² lawn area, saving over 250,000 gallons of water/year.

The Watershed Stewards Program's (WSP) mission is to conserve, restore, and enhance anadromous watersheds for future generations by linking education with high quality scientific practices.



A program of the California Conservation Corps, WSP is one of the most productive programs for future employment in natural resources. WSP is administered by CaliforniaVolunteers and sponsored by the Corporation for National and Community Service.



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The Tributary Tribune showcases the adventures, insights, and art of members of the Watershed Stewards Program. For 21 years, WSP has been serving communities throughout California's coastal watersheds. This issue features stories and art by members from Region I, District B, which encompasses WSP sites from Fortuna to Petrolia, CA.

Top left: Ethan Amezcua, Jake Murphrey, Jon Guczek, Kristy Smith, Tyler Brown, Jon Lee

Bottom left: Willie Clancy, Katie Finnigan

Not Pictured (but not forgotten): Kalyn Bocast

Blue Green Algae and You!

By Jon Lee

Placed at CDFW North Coast Watershed Improvement Center

As you head into the cooling waters of our rivers this summer, it's important to be aware of potentially toxic blue green algae blooms. Also known as cyanobacteria, blue green algae inhabit most aquatic ecosystems around the globe. Most are harmless plankton that form the base of aquatic food webs. However, given warm, slow moving waters and abundant nutrients, blue green algae can grow exponentially and form massive blooms where significant portions of the water surface are covered in blue green scums or mats. These

algae population explosions sometimes create substances that are toxic to pets, wildlife, livestock, and people, which is why it's important to be aware of them and which watersheds are impacted.

Blue green algae are some of the earliest life to inhabit the Earth.

They all can make their own sugars from sunlight and water, and many can harness nitrogen from the air to make their own proteins. From the point of view of blue green algae, the only thing that limits their growth is the amount of dissolved trace minerals in the surrounding water that they need to grow their cells. Typically phosphorus is the limiting factor in aquatic environments. As human activities, like agriculture and run-off from developments, increase the amount of phosphorous in streams, blue green algae are no longer limited in their growth, causing algae

blooms. Some algae blooms are naturally occurring, but many are caused by human activities that create excess nutrients in otherwise typically low nutrient aquatic ecosystems. When stream flows decrease in the summer drought months, waters become warm and slower moving; add a little extra phosphorous and conditions become ripe for blue green algae blooms. Many algae blooms are ecologically harmful because as they deplete their nutrients, the algae die off and create waters with low dissolved oxygen as they de-

compose. Aside from creating low oxygen conditions, some algae blooms create neurotoxins and liver toxins. It's still unknown to science exactly why some algae create these substances and some don't. Even within the same species some blooms are harmless and some are toxic.



Only a few genera of blue green algae that inhabit California waters create toxic substances, but because identification usually requires a microscope, it's best to view all surface algae scums as potentially harmful.

Continued on next page...

As Watershed Stewards Program Members, it's our obligation to educate the public about the dangers of blue green algae blooms.

When coming across an obvious algae bloom:

- Avoid drinking the water. Even treated water typically doesn't remove algae toxins.
- Avoid swimming in impacted waters, or at least towel off quickly, as some algae toxins can be absorbed through skin.
- Avoid letting pets and other animals swim or drink from impacted waters.
- Small children can be more susceptible than adults because of their smaller body volume.

According to the California Department of Public Health, blue green algae blooms have recently occurred in the following areas:

- Siskiyou County: Klamath River
- Humboldt County: Big Lagoon, Eel River, Van Duzen River, Mad River
- Lake County: Clear Lake
- Santa Cruz County: Pinto Lake
- San Joaquin County: San Francisco Bay Delta, Stockton Channel
- Kern County: Lake Isabella
- Mono County: Crowley Lake
- Riverside County: Lake Elsinore

Some ways to help:

- Use low phosphorous soaps and household chemicals to decrease excess phosphorous runoff in treated sewage.
- Educate land owners about appropriate fertilizer use practices, saving them money and making their land use practices more effective.
- Plant rain gardens to capture and filter runoff from impermeable surfaces.
- Educate septic system owners about how to inspect their septic system and make sure it's properly working to decrease high nutrient runoff.



The absorptive quality of rain gardens help mitigate nutrient runoff.

Image from wpd.jcdh.org

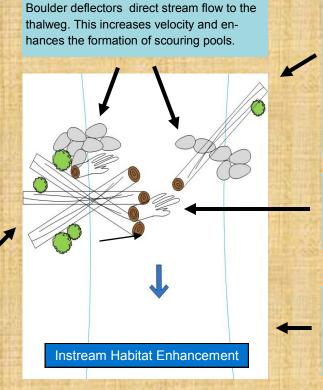
Restoration Techniques Using Boulders & Large Wood

KEY Boulder Deflectors Willow Stakes Stream Flow Large Wood Rootwad

Anchored logs increase habitat complexity, providing cover and cold water refugia for aquatic life. In addition, logs help to create scour allowing for deep resting pools and the maintenance of clean gravels which attract insects (AKA fish food).

Deciduous Tree

By Kalyn Bocast— Placed at CCC Fortuna



The angle of this placed log will help direct the flow of water towards the right bank structure; increased velocity will create greater scouring of streambed substrate and encourage the formation

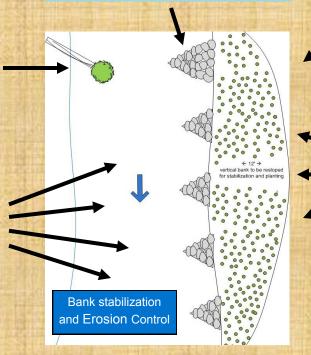
Rootwads help to create habitat complexity, scouring, and added cover for fish and other aquatic life.

Sorted substrate from the scouring action of the placed structure will help create more suitable fish spawning habitat downstream.

Modify the angle of existing instream wood. The wood is acting as a deflector, directing flow towards eroding bank. It will be modified to point parallel to the flow. This will help protect the right bank and provide cover for juvenile salmon during summer low flows.

A series of smaller boulder deflectors also known as "wing deflectors" will continue to direct flow away from the eroding bank. The smaller size will have less impact on water velocity insuring that the flows will not erode opposing bank.

This large boulder deflector will redirect the flow away from the eroding left bank. In addition, it will create an eddy allowing for sediment to deposit on failing right bank.



Bank is resloped to a 1:1 ratio using an excavator. This will create greater stability of the bank and reduce the rate of erosion.

Willow stakes are locally harvested and planted throughout the resloped bank. Once established, roots will hold soil in place and greatly reduce the rate of erosion.

Native Grass Planting

By Kristy Smith
Placed at Mattole River Alliance

"How many more DACA do we have left?" "Only two more boxes!" Christina—(another grass planter)—replies excitedly.

DACA, short for *Danthonia californica* and better known as California Oatgrass, is but one of twelve native grass species that was planted by the thousands as part of the Mattole Restoration Council's Native Grasslands Enhancement Program. I had the great fortune to come partake in this incredible restoration project this past November with my site mentor Monica Scholey, NER program director Hugh McGee, former WSP member and current MRC staff Christina Malatesta, my site partner Kate Finnigan, and Bob "The Barbarian" Anderson. Based solely on the lineup of people I would be planting grass plugs with up on Paradise Ridge in the King Range National Conservation Area, I knew this would be an experience to remember. Over the course of 8 days of exceptionally hard labor, the five of us planted 23,517 individual grasses! (One day, Bob single-handedly planted 900 plugs). As each long day came to a close, we would scramble up the steep slope we had been planting in all day with our gathered empty planter trays and containers to pack up for the return to the native plant nursery in Petrolia. The last fifteen minutes or so were typically spent admiring the breath-taking sunset. The sky would shift rapidly from a brilliant blue to soft pink mingled with orange and finally fade to deep lavender over the immense tree line. Though it may sound cliché, those sunsets felt to me like nature's show of appreciation for our efforts to restore this historic prairie. Native

grassland restoration was both some of the hardest and most rewarding work I have ever done....and it *does* actually relate to salmonid habitat.

Grasslands play an important role in the hydrologic cycle, primarily in the storage and slow release of groundwater. As rain falls over grasslands that are upslope from running streams, the water is allowed to slowly percolate through the soil due to the enhanced cation exchange capacity associated with nutrient-rich soils typical of grasslands. Hydrogen molecules interact with the ions held in the soil particles of this productive and deep soil, increasing the stormwater's residence time within the upper profile of soil. Additionally, the fact that the soil



Kristy Smith (right) and her site partner, Katie Finnigan, planting native grasses.

located on these ridges is very deep means that the water has farther to travel before it will re-emerge as surface flow in creeks, streams, and rivers. This storage in critical during the summer months when stream flow is at its lowest and groundwater recharge become a prominent contributor to flow. These dry months are also critical during salmonid life cycle as juveniles are in their rearing stage of development. Thus, in order to enhance salmonid habitat, the Mattole Restoration Council determined that watershed as whole, including upslope areas, must be taken into account.

The Native Grasslands Enhancement Program (NER) began in 2008 with revegetation of Spanish Flat with native grass species. The program goal is to "...gain a better understanding of the current state of native grassland ecosystems within the Mattole watershed, preserve remnant stands, and implement native grassland enhancement project in priority areas." Coastal prairies of the Pacific Northwest are few and far between compared to the pre-settlement era. Invasive grass species have overtaken much of what was once open grassland that supported complex ecosystems consisting of unique wildlife and flora. Here in Humboldt County, the main threat to our native prairies is Douglas fir encroachment. Prior to the gold rush, Native Americans who inhabited coastal Northern California maintained these prairies as open space fit for game to forage by yearly burning practices that inhibited the growth of trees and other woody plants. Native grasses that persisted in these biomes were predominantly perennials and had adapted to frequent fires and seasonal drought. When the Native Americans were forcibly removed from these ancestral lands, their traditions of maintain the prairies left with them. With the combination of overgrazing, introduction of nonnative species, and an "era of fire suppression", fire-intolerant tree species like Douglas fir and brush have rapidly colonized much of what was grassland. More than 45% of former King Range grassland has been lost to this encroachment. The Mattole Restoration Council partnered with the Conservation Lands Foundation and the BLM and began to take direct action in 2007 by collecting seeds of native species from remote native populations located in the King Range; these seeds were then propagated at the Native Plant Nursery. This endeavor has since expanded in the seven years since its conception to include local "native grass farms" in which plugs of the native species have been planted and their seeds harvested for future projects.





Seed produced by the Mattole Native Grass Seed Farm will go to future restorations projects around the Mattole River watershed.



Instream-Structure Effectiveness Monitoring

By Ethan Amezcua

Placed at CDFW Monitoring and Evaluation of Salmonid Habitat Restoration







Images 1 through 3: Pre-treatment dam site (left); beginning of natural redistribution of sediment, 1 month after treatment (middle); natural redistribution of sediment continuing to occur 3 months after treatment (right)

When is a restoration project considered effective? Did the sediment ultimately distribute so that salmonids could migrate, as intended, to the 2.7 miles upstream of this dam? The above images tell an inspiring tale of the removal of a fish barrier; but to what extent will the stream gradient equilibrate above and below the site? And how will this redistribution of sediment affect channel complexity?

The dam site at Olds Creek in Mendocino County provides a great illustration of how the *thalweg profile* is a tool that can be used to examine the impact of a restoration project on a stream. Here, CDFW surveyors followed the deepest part of the stream channel (the thalweg) and measured elevations as they surveyed past the dam. Using a differential levelling procedure and an auto-level (a glorified telescope), the elevation readings provide a model of the streambed (Figure 1) that helps us quantify and visualize stream complexity (ie. the stream gradient and distribution of pools and riffles) above and below the barrier.

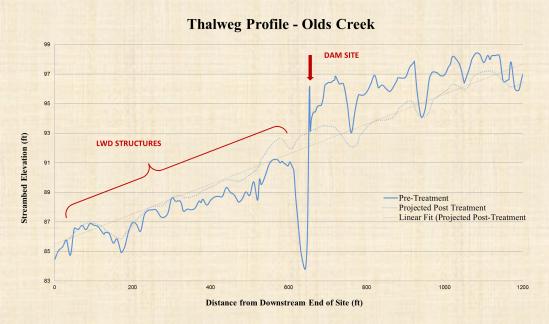


Figure 1: Pre-treatment (solid-line) thalweg profile at the Olds Creek Habitat Barrier Removal site. The large difference in streambed elevation across the dam site demonstrates the aggredation of sediment. After removal, that sediment is projected to redistribute and fill the large plungepool and recover a more accessible stream gradient. The dashed-line demonstrates the idealized post-treatment redistribution of sediment and its associated gradient (the slope of the linear fit).

The pre-treatment survey of the thalweg reveals an accumulation of sediment behind the Olds Creek dam and an associated discontinuity in thalweg elevation. On closer inspection, not only was the dam itself a barrier, it altered the stream gradient and allowed hydrologic effects to store finer sediment behind the dam and exposed large cobble and small boulders downstream – unsuitable habitat for spawning salmonids (particularly unsuitable for the endangered coho salmon historically found in this system, who prefer gravels). The Olds Creek Habitat Barrier Removal Project involved manually redistributing some of the sediment in the immediate vicinity of the dam site, and the installation of numerous instream large woody debris (LWD) structures downstream of the barrier removal. LWD structures help provide roughness along the stream banks, promoting channel complexity and the deposition of spawning gravels that might otherwise be flushed out of the system.

Changes to stream complexity are important aspects of any restoration project, and they are greatly influenced by how the project design was engineered and implemented. When CDFW surveyors return for their post-treatment thalweg survey of the Olds Creek project, a real before-and-after comparison will provide an important picture of how the gradient and channel complexity responded to the restoration project. Figure 1 includes a projected post-treatment thalweg profile based on expected change in gradient after barrier removal; however, post-treatment surveys conducted in 2015 and future years will document actual sediment redistribution and changes in stream complexity over time.

Although many other indicators will be used to assess the project's overall effectiveness, the thalweg profile provides information such as the severity of migration barriers and abundance of rearing and spawning habitat that fish will likely "understand."



Image 4: Auto-leveling procedure – note measuring-tape pulled along thalweg.



Image 5: Implementation of project – extent of manual redistribution of sediment.



Image 6: Post-treatment dam removal site at high flow – the natural sediment redistribution process in action.



Image 7: The former Olds Creek Dam site.

Member Pledge

By Tyler Brown

Placed at CDFW North Coast Watershed Improvement Group

BEEEP!...BEEEP!...BEEEP!

BEEEP!...BEEEP!...BEEEP!

5:30 AM

The same conflict every morning. Should I heed this alarm blare? Maybe I should steal 5 minutes of warmth and comfort from last nights ambitious planner.

No. It is time to find common ground with myself. Besides, a hot shower is the only place to find relief from this poison oak rash covering my arms.

This will be another day surveying on Bear Creek. I wont see any fish. The creek is still too scarred from decades of logging. A few salmon still fight their way up the miles of the muddy homogeneous creek each year but their run is over for the year. We haven't seen any fish for a month and the water leveling is dropping. Worse than the poison oak I will have to trudge through is the willow; slapping me in the face for miles as I walk. It's hard not to take it personally. *Salix*—not just a genus but a personal adversary.

The hot water magic is starting to take effect – and I slowly begin to remember the importance of zeros in science. I wont see any salmon in Bear Creek but that information is important too. This AmeriCorps position isn't after-all just an excuse to wander in the woods and observe endangered species. Time to get out of the shower – it did its job. I can persevere another day. I'm ready to contribute to scientific understanding.

7 AM

Still dark and still cold. But I see people moving in Fortuna as I pull into the California Fish and Wildlife parking lot. This group of Americans are all here doing their job. A strong community of people who care are coming together to do what they can for the salmon. It's always impressive to see people working before the sun rises. There isn't any apathy in the people working at the California Fish and Wildlife – only people taking action. Soon the fleet of government rigs full of tired biologists will spread out to forgotten creeks across Northern California looking for salmon – looking for creeks where we can make a difference.

9 AM

A short drive today. There's a little bit of hesitation to step out of the truck and into the cold wet waders that long ago gave up any pretense of being waterproof. But before long my site partner and I are ready. Ready to forge our way upstream in search of redds. We're ready for the poison oak, ready for the willow, ready to get things done. We are ready to keep our commitment to the salmon, the environment, and our community. Today, tomorrow, this year and beyond...

And maybe....Maybe we'll even count some fish.

Tree of Veracity

By Katie Finnigan
Placed at Mattole River Alliance



Here beauty lies

Past and present

Illusive, masked, not forgotten

As we mold our world

It molds our vision

The sand won't hold long

Soon the mask will crumble

Seven Suggestions for Surviving Spawner Season

By Jon Guczek

Placed at CDFW Coastal Watershed Planning and Assessment Program

Waking to my alarm I slowly roll out of bed and catch my bearings. With a quick stretch and a sip of water I get dressed and stumble my way out of our dark trailer and make my way to the kitchen. After firing up some coffee and scarfing down some yogurt and granola, I pack my lunch put my dry suit and stream boots in my crate and put them in the back of our field truck. After a 20 minute drive we pull off on the side of the road, get out, and start the ritual of gearing up, handing out survey gear, and pumping up our inflatable kayaks. After a quick scramble down a rocky slope we put the boats in and are on our way. A gripping cold hangs over the valley of Ten Mile Creek. The sun rays clash with the steam coming off the water's surface. Within a few hundred meters of paddling my paddle and gloves were covered in ice. As we paddle around a bend a bald eagle takes off from its perch on a tall dead tree and flies majestically over the horizon....



This may seem like a story from some expedition in Alaska but in reality this is a day in the life of the South Fork Eel Spawner Survey Crew right here in Northern California. Here at CWPAP (Costal Watershed Planning and Assessment Program) this has been part of the daily routine from mid-November to February. For four triumphant days of the week we collected data on pacific salmon and steelhead spawning activities. No matter if its wading, paddling, or floating, these daily adventures never disappoint and have made my WSP year amazing. For this Tributary Tribune submission I'd like to share some tips that helped make 2014/15 spawner survey season a great one.







1. Remember you're a guest.

It's important to remember that a trio of threatened salmonids that call our survey streams home. So my first piece of advice is to simply tread carefully. The last thing any of these fish need is a big bootprint in the middle of their redd.

2. Zip it up.

Zip your dry suit fly up before you go in the water. Enough said...

3. Follow the smell.

Carcasses are a vital piece of data but sometimes these heaps of rotting flesh end up in places that aren't always obvious. When in doubt use your nose and follow the stink to scale and tissue sample glory.

4. Stay Sharp(ie)

They say the pen is mightier than the sword and in this case it's the felt marker. This is a critical tool for hanging flags over those sweet new redds you observed. Keeping the marker dry will allow for a truly enjoyable flag writing experience. Having an extra marker helps for those moments when you drop the cap in the water, it floats into oblivion down the stream, and you have to finish the reach holding the marker in your mouth half the way to keep it dry.

5. Blow some hot air (in the dry bag).

When charging down the creek in a pack raft (the Cadillac's of the kayak world) it's easy to picture yourself conquering some epic class V rapid. Once you stop day-dreaming you realize that you're bottomed out in 3 inches of water. The key to coasting over the low water and enjoying a gentle paddle on the creek is the dry bag. By filling this with air when you close it you can kneel on the tube of the boat and cruise along with counting fish and redds.

6. Say Yes to the Vest.

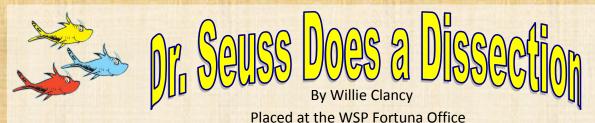
We all know the first rule to anything is looking good and there's no better way than rocking an elegantly

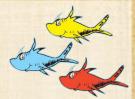
frayed (aka many holed) field vest. These things have enough pockets for all of your survey accessories and even have room for your lunch. You'll look fly and be organized and that goes a long way.

7. Enjoy where you are.

Having the unique opportunity to survey for salmonids means that you're going to end up in areas that not many people get to see. As the season goes on, names of specific streams will resonate with you and even become routine. My last piece of advice is that even though it's only 11 am and you're cold and it's raining, stop for a second and think about how amazing some of the places that you end up are.







Hello everybody! I've heard your wish. Today we'll learn how to dissect a fish. It'll work for salmon and steelhead trout. Now come listen to what this is all about.

After you teach 'bout the external parts
Grab your scalpel and the real fun starts.
Hold the fish on its back and don't mind the scent!
And for easiest access you begin at the vent.

Cut from the vent to the bones in the head And you will see what was meant to be in a redd. If the fish was female the first thing you'd see Is thousands of eggs that were never to be. If it was male, you'd come full tilt. You'd see two testes filled with unused milt.

Now you've come to an important juncture. You see an air bladder that will easily puncture. But there are other organs to which you can cater Say to the bladder, "Nah, I'll just do you later."

The liver stands out so I cut it out soon. It's fleshy, soft, and colored maroon. Hope the liver doesn't mind being stuck to a small sac.

Oh the gall of that bladder to live right on its back. But their coming together turns out not to be random.

They digest fats, balance chemicals, and work as a tandem.

There are many other parts; I'll try and list 'em So let's start with the rest of the digestive system. To remove the esophagus just takes a small cut And that will lead down to the rest of the gut.

The stomach comes free through your lacerations Whose juices dealt with bugs, other fish, and crustaceans.

And the stomach has a good partner in crime. It looks like spaghetti that's covered in slime. Look at that guy; wonder was he does? It's time to tell you about those pyloric ceacas. So what does it do? Time to answer your question. It absorbs nutrients and aids in digestion.

There are two more parts of the digestive team
That small dark organ is the blood-storing spleen.
I bet we can guess the next part of digestion.
The food gets absorbed through their tube-like intestine.

Done with digestion; on to the next part. Move towards the head and then cut out the heart. Where we have four chambers, they have just two, But one atrium and ventricle will just have to do.

And next it's time for one of the thrills.
Pull up the operculum and slice out those gills.
You see they're red and branched upon further inspection

And they intake oxygen with those fan-like projections.

Back to the bladder; please handle with care!
Scrape from the sides and remove it from there.
It looks like a balloon with a see-through cover.
The air provides buoyancy and allows fish to hover.

Now you see two joined kidneys, a front and a back They're so dark with blood that they almost look black.

Blood producing and cleaning is what this organ's

To remove, cut on both sides and then scoop it on out.

Also, the kidney is key in ocean preparation.

During smolting it helps with osmoregulation.

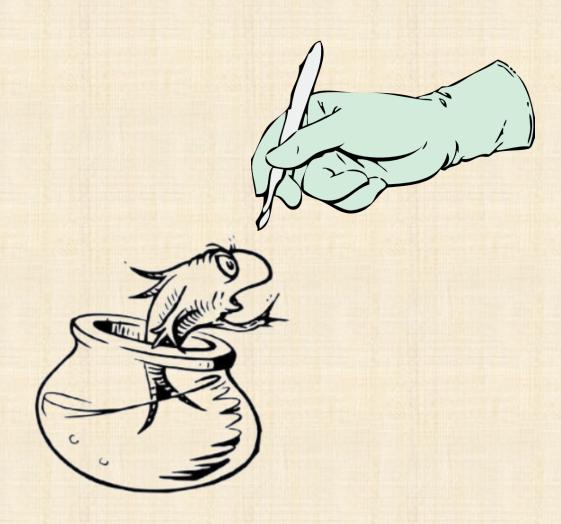
The salmonids have to get used to the salt

Or else their existence will quickly come to a halt.

You look at the clock and if time remains
Your audience would love to look at those brains.
Put aside your scalpel and pull out your knife
And if the excitement had waned, it just got new life.

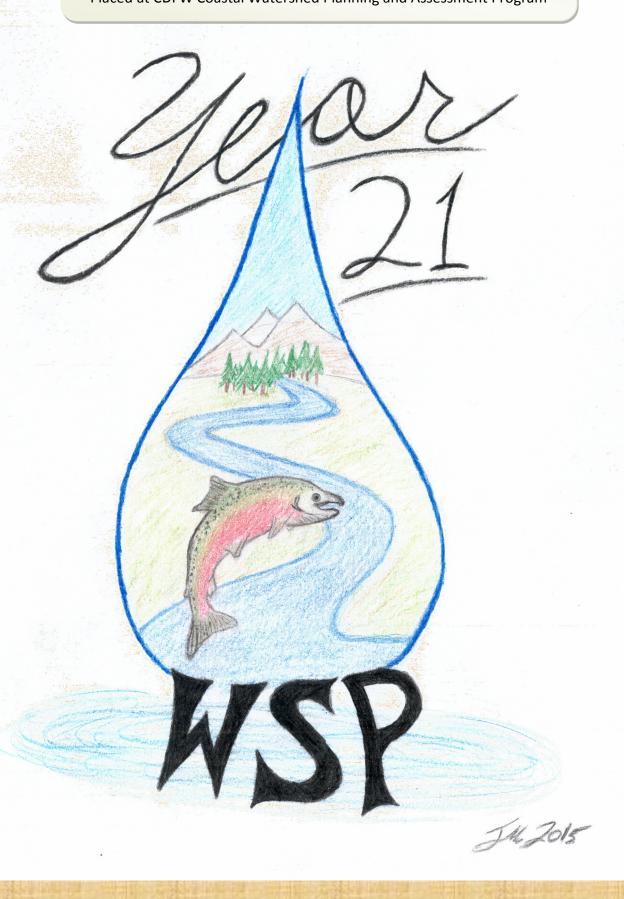
You can go straight for the brain or remove the head first.
Be tactful or brain very well may burst.
Keeping it all in one piece will be your main issue.
Thin slices will prevent damage to the tender brain tissue.
Once you've taken the slices right off the of top
Remove the brain with your knife and now it's time to stop.

That's how you dissect; it's time to get on it. Go get your scalpel and cut up a salmonid!



WSP Logo and Salmonid Word Search

By Jake Murphrey
Placed at CDFW Coastal Watershed Planning and Assessment Program



N D B U V V N J D M Y I S L B O T X O O LZE T SBIJVAPMAWBPLNT B P J H G Q N Y Q B A Q O R Y X L B D C TRVOSOAFKWLULGXTLC N B Z G M R G D N L I A T E C Z O T F U CXJLXFEE JUDMDWWAWGCL CKAEOPRTNJAAOOTAMMDO SFLGSACAZEFNORFDZGO OHOCUGVYDWHDPDYPJEAO Z TRC SUVJOLNIYBRGMRI RPVCHINOOKEVLDHGFWRS EWKJOUYLENJEVANUVN RE YP ZARHVAILTBRBYLSSW X C F M N B Y L N Y S A G R E V Z Y X S OMYTFWRZMIWBJIOMHSUK AEKRHRIULULMMSMGODHW X P K F D J G N R Y E I W F M E J C \mathbf{E} J J Z A C N E U Z M V R H D R G P G H UOMORDANANMNYRDSCXF DEAETDFPQYAADNNIAOIO

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Want to be a WSP Member?

We are currently accepting applications for Year 22, which begins October 5th, 2015. All of our application materials can be found on our website.

